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by

Jo Ann Halunen

University of Minnesota

Duluth, Minnesota

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CHAPTER ONE

THE PROBLEM

I. INTRODUCTION TO CREATIVITY

Creativity is:

. . . . The difference between understanding and labeling, feeling and accepting;

. . . . Man taking time out of the everyday rush to take a long look at his world;

. . . . Man seeing the rhythmic pattern of rustling leaves, the swirling cycles of foamy water, love, hate, war;

. . . . Man responding to his world, seeing his needs, getting new ideas.

Creativity in art is aesthetic perception, beginning in sensory impressions and ending with a symbolic feeling that is put in a concrete art form. (21. p. 54) It is a human activity which transmits to others the highest and best feelings men have to give. (22. p. 193) It is not a product of nature, but a product of the human spirit, of thinking and of emotion. (16. p.271) It is a product which everyone in society could produce, but it is produced by few.

Man is an organism that not only lives "in but through" his environment--an environment that is not always friendly, since it does not always meet the organism's needs. Man must either try to control his environment or try to adjust to it. If man is to come to terms with his environment, he must behave intelligently, using intelligence based upon past experience to cope with the problem situations arising during his lifetime. Education, conceived of as the "process of expanding human intelligence, thereby increasing its capacity to experience," develops this concept of man's nature. It provides a physical, emotional and intellectual freedom with an opportunity to exercise intelligence on problems that are meaningful to man. Meaningfulness means self-expression, and art becomes the opportunity to unlock the creative capacities of man. Once unlocked, these latent creative capacities can be applied to areas other than the arts--areas in which creative intelligence is needed to maintain equilibrium in an unpredictable environment.(6. pp. 8-10)

Children begin to unlock their creative capacities when they explore problems that concern them. As a child creates, he is confronted with his own self, his own experience. As he creates, his thoughts concentrate on the experience he wants to express. He expresses his likes and dislikes, his emotional relationships to his own world, the world which surrounds him. Two very important factors are combined: his knowledge of things and his own individual relationship toward them. He also tends to become more sensitive to the needs of others.(17. pp. 4-5)

During the adolesence crisis, the child battles for many far-reaching decisions. He stands on the threshold of adulthood, in confused critical awareness of our traditional concepts that establish a "naturalistic relationship to environment," a relationship which develops a "true" picture of the external world, hopefully established from as many angles, periods, and cultures as possible. As truth is replaced by subjective reaction, art through identification becomes a common expression of mankind.(16. p. 271.)

By identifying himself with his own art works, the child learns to subordinate his personal needs to those of his environment in a spirit that contributes to the understanding of his neighbors' needs. He creates by identifying with the problems of others and he learns by using his imagination to understand the needs of others as if they were his own. This self-identification learned from art education helps him to live cooperatively as an aware human being educated not only with knowledge but also with empathy.(16. pp. 43-45)

Art, for the child, may also be the necessary balance between the intellect and emotions. Our present educational system is based on learning which, in most instances, means acquiring knowledge of "the right answer." Yet, knowledge alone does not satisfy most people. One-sided education with its emphasis on knowledge neglects the very important attributes which our children need to adjust properly to this world. Knowledge based on the "right answer does not always fit man's needs since every life situation does not have "a right answer." Situations arise when man must not look for just the "right answer" but for the many possible

answers from which he can choose. This search means looking for fresh, original, and valuable ideas on a continuous basis. It means scanning past information to find unique answers that satisfy man's individual needs. It means learning to think creatively in order to survive in an ever-changing world. Art for a child may well mean the difference between an adjusted, satisfied individual and one who, in spite of all book learning, will remain an unbalanced individual who has difficulty in his relationship to his environment. (17. p. 9)

How creative thinking can be released or taught is one of the problems to be solved by our educators. The purpose of this paper is to explore one of the possibilities of supplying the environment for the release of creative thinking--creativity in an environment of divergent thinking and expression.

II. DEFINITIONS OF TERMS

Convergent Thinking. Convergent thinking is reflection which tends to find just one answer. Since creative thinking need not come out with one unique answer, convergent thinking is not an indicator of creativity. It is also not desirable in art where, once again, there is no one right answer, but only answers that are more aesthetically satisfying than others.

Creativity. According to the Fifth Utah Creativity Research Conference, creative thinking is defined as the ability to form "new combinations of related elements in a useful way or the capacity to produce fresh, original, and valuable ideas of a continuous basis." (19. pp. 55-56)

According to Webster's New Collegiate Dictionary, to create means, "1. To bring into being; to cause to exist. 2. . . . b. To produce, form, or bring to pass . . . 3. To produce as a work of thought or imagination, especially as a work of art."

Creativity has also been defined as a product (an invention or discovery), a process, a kind of person (the creative individual), and a set of conditions.(12. pp. 3-5)

Deliberate Personality. Deliberate personalities learn by being informed rather than by discovery. They work in a step-by-step manner and their work is always preconceived. They are rigid in their personality orientation and are insecure when faced with creative problems.(3. pp. 2-4)

Divergent Thinking. Divergent thinking refers to scanning one's stored information or finding answers to satisfy his needs. Thinking need not result in a unique answer.(10. p. 284;11. p.492)

Elaboration. Elaboration is the ability to work out details of a plan, idea, or outline or a variety of implications used to express an idea.(11. pp. 490-491)

Flexibility. Flexibility in thinking means some kind of change in responses (spontaneous flexibility) or a change either in meaning, interpretation, understanding, strategy, or direction of thinking, which may mean a new interpretation of the goal. It is the ability to shift from one approach to another, to free oneself from previous ideas (adaptive flexibility).(11. pp. 486-487)

Fluency. Fluency refers to the ability to produce a large number of ideas. "Ideational fluency" has to do with the rate of generation of a quantity of ideas that fit a class whereas

"associational fluency" pertains to the completion of relationships.(11. pp. 487-488)

Originality. Originality is the ability to produce remote, unusual, or new ideas.(8. pp. 243-248)

Spontaneous Personality. Spontaneous personalities are characterized by impulsive feeling and thought. They are flexible, complex, impulsive, inquisitive, abstract, perceptive, and emotionally open. They are self-determining in their personality structure.(3, p. 4)

Structured Art Program. In a structured art program, the students are given an assignment with step-by-step procedures as an approach to the problem. They are told what to do and how to do it. They have no choice of media or methods. For example, in a color unit, they are told to mix as many colors as they can, using the three primary colors--red, yellow, and blue. They are also told to pick two opposite colors, to make as many value changes as they can by adding white and black, and to make as many intensity changes as they can by adding its complement.

Unstructured Art Program. In an unstructured art program, the students are asked to discover possible answers to a problem. They are given a theory within which they will work. They can work in whatever media and with any methods they wish. For example, in a color unit they can do whatever they wish as long as they change the hue, value, and intensity of the colors they work with.

III. LIMITATIONS

The findings of this study are limited by the following factors:

1. The unstructured and structured art classes are not matched groups but regular senior high school Art I classes consisting of students selected at random.
2. The experimental period of one semester may not be enough time for students to change and control thinking patterns.
3. The teaching, evaluation of art products, and correcting of the Torrance Tests of Creative Thinking have been done by the author of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

"Art is a human activity consisting in this, that one man consciously by means of certain external signs, hands on to others feelings he has lived through, and that others are infected by these feelings and also experience them."

Leo Tolstoi, What is Art?

" . . . the artist appeals to the part of our being which is not dependent on wisdom; to that in us which is a gift and not an acquisition--and, therefore, more permanently enduring. He speaks to our capacity for delight and wonder, to the sense of mystery surrounding our lives; to our sense of pity, and beauty, and pain."

Joseph Conrad, The Nigger of the Narcissus

We might compare these descriptions of art with the creative process described by a practicing artist, Cezanne. "Expression for me is not to be found in the passion which blazes from a face or which is made evident by some violent gesture. It is in the whole disposition of my picture--the place occupied by the figures, the empty space around them, the proportions--everything plays its part."(22. p. 195)

Tolstoi, Conrad, and Cezanne described the real function of art, the expression of feeling and understanding. That is what the Greeks in the Hellenistic Period so perfectly realized, and that is what Aristotle meant when he said that the purpose of drama was to "purge our emotions." A work of art is charged with many emotional complexities, not only an excitation of emotions but peace, tranquility, and composure. It arouses in us certain physical reactions; we are conscious of rhythm, harmony, and unity, physical properties that work upon our nerves, not so much agitating them as soothing them, resulting in a state of emotion that is totally different in kind from the emotion experienced and expressed by the artist in the act of creating the work of art. The artist is the creator, a man who by his special gifts has solved our emotional problems and leaves us in a state of wonder, admiration or recognition.(22. p. 199)

In recent years, more and more psychologists are doing research on the creative nature of the artist. Since the fifties, research in creativity has come into full bloom. There is considerable agreement among researchers in creativity that everyone is born with a high endowment of awareness; that the creative attitude seems to have been built into the species. But, by no means, have the findings concerning human creativity in the arts or elsewhere been conclusive. There is relatively little in the way of facts to provide guidance to teachers attempting to develop the child's artistic creativity. The findings so far are suggestive; much more is available in the way of descriptive research findings than is available as experimental research findings.

In the work that has been undertaken in the study of artistic creativity, a variety of research methods have been used, and a number of objectives have been pursued. Some workers have concerned themselves with the problem of identifying those behaviors which constitute creative performance; others have attempted to identify the working strategies used by creative individuals, and some investigators have attempted to identify the types of instruction that seem conducive to creative productivity. Research in creativity has probably raised more questions than it is answered. Art education is now reassessing some of its most cherished beliefs concerning the artistic development of man. (6. p. 218)

I. STUDIES ON CREATIVITY

After a ten-year study on the nature of artistic aptitude, Norman C. Meier has made certain observations on the nature of artistic aptitude. His principal conclusions rest on the experimental work of research assistants, case-study records of six talented and six non-talented children, and the life histories of forty-one American artists. The finding of greatest interest indicates specific interaction of inherited aspects of talent with the learned phases. Artistic aptitude is characterized as possessing six factors: manual skill or craftsman ability, energy output and perseverance, aesthetic intelligence, perceptual facility, creative imagination, and aesthetic judgment, with the greater emphasis being placed upon heredity--constitutional stock and manual skill. These conditions interact with the energies of the individual to develop his artistic competence. However, the individual is the final determiner in the situation. A person possessing these

factors can bring about an artistic end, but a person lacking these qualities is not able to bring this end about to any great degree. The position is, therefore, that certain neurophysical and developmental factors need to be present for artistic development and that these predispositions are not present equally in all persons nor if absent can they be established.(20. pp. 105-116)

All people exhibit a certain amount of creativity; however, some are more creative than others. The findings of many studies have given detailed listings of the characteristics of these more creative individuals.

Of the studies completed to date, perhaps Roe's gives the most basic description of the creative individual. Roe has suggested that the most common trait of leading creative artists is their "willingness to work hard and work long hours."(12. p. 10) Barron (1966) agrees that "discipline of form, tireless rewriting and shaping up, and a touch of the old shoemaker's pride in craftsmanship . . ." are among the characteristics of creative writers.(12. p.10) MacKinnon has written in his research findings on creative adults, "Creative people have an inordinate drive toward their work . . .; they also have an intense commitment to what they choose to do."(12. p. 10)

Dervdahl and Cattrell (1958), in a study of creative artists and scientists, conclude that the creative individual appears to be a withdrawn and sophisticated person who is less interested in people than in things. Conceivably the creative individual's preoccupation with things rather than people allows him more time and energy to devote to his work.(12. p. 10)

Torrance (1962) has listed some eighty-four traits or characteristics of creative individuals. Several of the descriptive traits are:

1. Acceptive of disorder
2. Adventurous
3. Always baffled by something
4. Defiant of conventions of health
5. Disruptive of organization
6. Energetic
7. Full of curiosity
8. Independent of thinking and judgment
9. Intuitive and original
10. Odd in habits
11. Persistent
12. Self-assertive
13. Self-confident
14. Not interested in small details
15. Stubborn (12. p.11)

One of the important characteristics for differentiating between the highly creative and highly intelligent in the Getzels-Jackson study is the trait of humor or playfulness. Torrance (1960) in his partial replication of the Getzels-Jackson study has also found a similar trait and reports that teachers rate the highly intelligent students as more desirable, more ambitious and hard-working, less unruly, easier to understand and more friendly than the highly creative groups. The creative groups are characterized by great curiosity and ability to ask penetrating questions and by showing more vivid imaginations with fantastic answers to

certain questions and displaying, at times, a considerable lack of control, and often lead many teachers to view them as generally undesirable students.(12. pp. 8-12)

John L. Holland's study of creative and academic performance among talented adolescents "suggests that creative performance at the high school level occurs more frequently among students who are independent, intellectual, expressive, asocial, consciously original, and who have high aspirations for future achievement. Students who are persevering, sociable, responsible, and whose parents hold somewhat authoritarian attitudes and values are more frequently academic achievers." Torrance and Getzel both report that the most intelligent students (top 20%) are not necessarily the most creative; only about 30% of the students are in both groups. They agree that intelligence has little or no relationship to creative performance in arts and science or to academic achievement.(14. pp. 511-521)

Studies comparing I.Q. measurements and creativity, tend to support the following conclusions:

1. High I.Q. and creativity are not synonymous (Getzels and Jackson, 1962).
2. The coefficients of correlation between intelligence and creativity measures are rather low, ranging from .20 to .40 (Yamomoto, 1960).
3. Intelligence, as measured by standard instruments of today, has been found to be more complex in its relationship with creativity than had previously been expected (Eisner, 1963).

4. The correlation coefficient usually ranks lower for the relatively factor-pure tests of I.Q. such as verbal comprehension (Burt, 1962; Hahn, 1967).(12. pp.9-10)

MacKinnon in his study of creative architects has also found a low positive correlation between intelligence and the level of creativeness. In addition, he reports that architects have a good opinion of themselves, score 5 to 10 points higher in psychiatric disturbances than the general population, rate extremely high on the femininity scale, and are more open in their own feelings and emotions. Contrasting to a sample of non-artists who reveal a marked preference for the simple and symmetrical drawings, the creative architects show a marked preference for the complex and asymmetrical. Their openness to experience disposes them to admit complexity and even disorder into their perceptions without being made anxious by the resulting chaos. On the Type Indicator they measure intuitive and in Jugian typology, 2/3 of the group scored as introverts.(18.)

Eindhoven's comparison between artists and non-artists shows that artists have more control over their creative processes than do non-artists; they "appear to acquire a pattern of dealing with creative situations which differs from that of non-artists," and they tend to evolve a final product, experimenting at first and gradually concentrating on certain features that are selected, modified, and reorganized.(5. pp., 49-51)

Eidusen also agrees that artists show a marked difference in thinking from non-artists. Their thinking is original and unusual;

they show a "richness" in their associations and modes of expression; their interests are broad, theoretical and abstract rather than realistic and practical; they show extreme responsiveness to sense data and a tolerance for ambiguity in perception. In addition, Eiduson notes the ability of the artist to "establish a multiplicity of identifications" and "to communicate his feelings and experiences so that others respond."(4. pp. 290-291)

Besides research on the overt characteristics of artistic personalities, psychologists have also hypothesized on the unconscious process of artistic creation. W. Born presents his theory which encompasses both the conscious and unconscious processes: the unconscious providing the inspiration and basic principle of design; the conscious providing the formative processes. He describes the artist as a person striving "to recapture the concept of completeness which he feels is indispensable for the creation of a work of art." The motive for his artistic production lies in his desire to recapture the freshness of his childhood world, a vision lost with the complexities and conflicts of adolescence. Released emotions associated with repressed experiences provides the energy for this artistic work and also constitutes the mechanism of inspiration.

Three factors contribute to the formation of the emotion into the artistic production: an "aesthetic threshold" which acts as a censor and provides inspiration; the basic principles of design, which also contribute to form and which are applied intuitively by the artist; and finally, the "culture conscience," the "agency

which sublimates the life instinct." The four functions of the culture conscience are seen as constituting four stages in the development of the work of art. These are: A. "Neutralization," the universality of the sublimated concept; B. "Universalization," being free from subjective expression; C. "Manifestation," conversion into a visual image; and D. "Organization," arrangement according to esthetic standards.

Form is the "redeeming quality of art." It "transforms the relentless images which intrude upon our senses into stable structures. It gives us the feeling of security if we fear reality, or it brings reality closer to us if we love nature." Form is achieved "through an emotional identification of the artist with the external world, namely empathy or through its opposite, abstraction." Apparently, these are the mechanisms with which the culture conscience functions.

In comparing his own view with those of Freud, Born denies the sexual source of libidinal energy. He maintains that the sexual instinct splits off from the more broadly defined life instincts. Thus, art is a sublimation of life, rather than sex instincts.(2. pp. 45-47)

Another aspect of the unconscious process of creation is the effect of the environment upon the artist and the work of art. According to Feibleman, a work of art depends not only on the artist but also upon his environment which provides the sensory experiences and values incorporated into a work of art. It also depends upon the artist, for he is more sensitive to the tangibles and

intangibles in his environment and to the meanings which they have beyond the meanings customarily assigned to them.

However, the artist's imagination is mostly an unconscious process which may be divided into four stages. The first stage is the gathering and selecting of impressions; the second is the revision and recombination by the unconscious which is characterized by the chaos of thought moving toward a final synthesis; the third stage is the "flash of insight," when the unconscious result gives way to awareness of a whole, not as a sequence of parts; and the final stage is the expression of the result, which is predominantly conscious.

Artistic expression is a logical process even though not based on facts. The introductory processes are laid in the first two stages, where ideas and emotions are selected and the over-all method of expression is decided upon. This selection and decision are the result of an "induction" upon experience. Deduction from this inductive base is performed in the last two stages. The best kind of art is obtained when there is a balance of form and content, of abstraction and representation. An excess of one is a violation of the balanced esthetic judgment characteristic of the disciplined imagination. (7. pp. 51-52)

Besides research dealing with personality characteristics of artists and the unconscious process of artistic creation, psychologists have also devised ways of identifying the creatively gifted child. E. Paul Torrance lists four ways of identifying the creative child:

1. Reacts positively to new, strange, incongruous, or mysterious elements in his environment by moving toward them, by exploring them, or manipulating them.
2. Exhibits a need or desire to know about himself and/or his environment.
3. Scans his surroundings, seeking new experiences.
4. Persists in examining and exploring stimuli in order to know more about them.

Guilford and Merrifield (1960) add to this list. They describe the creative child as showing:

1. Sensitivity to problems; seeing defects, needs, deficiencies; seeing the odd, the unusual; seeing what must be done.
2. Flexibility; ability to shift from one approach to another, one line of thinking to another, to free oneself from a previous set.
3. Fluency; ability to produce a large number of ideas.
4. Originality; ability to produce remote, unusual, or new ideas or solutions.
5. Elaboration; ability to work out the details of a plan, idea, or outline; to "embroider" or elaborate.
6. Redefinition; ability to define or perceive in a way different from the usual, established, or intended way, etc. (8. pp. 243-248)

There are a number of approaches to the investigation of the traits or characteristics in which creative individuals are most likely to excel. Practically all investigators recognize that

there are many potentially contributing conditions. When the problem is approached from the standpoint of individual differences, the most natural scientific technique to apply is the factor of analysis. Creativity tests have been designed and find the more creative individuals think with greater fluency, with more flexibility, and with greater originality. The test is designed to measure fluency in very simple tests and the quantity of output determines the score. Quality does not count, but the responses must be appropriate. Flexibility in thinking means a change of some kind--a change in the meaning, interpretation, or use of something, a change in understanding of the test, a change of strategy in doing the task, or a change in direction of thinking, which may mean a new interpretation of the goal. Originality means the production of unusual, far-fetched, remote, or clever responses. A novel idea is a new one so far as the particular individual who has it is concerned. Another criterion of an original idea is what is socially useful.

In verbal tests alone there are three differentiated fluency factors. Ideational fluency has to do with the rate of generation of a quantity of ideas. The idea produced may be as simple as a single word, or as complex as the title for a picture or a story. In a test, the examinee may be asked to list all the things he can think of that are solid, flexible, and colored. He may respond with cloth, leaf, rose petal, hair, skin, leather, etc. Any response that fulfills the specifications is accepted and counts toward the total score.

Another kind of fluency is called "associational fluency." It pertains to the completion of relationships, in distinction from the factor of ideational fluency, which involves giving ideas that fit a class. The examinee may be asked to list all the words he can think of that mean the opposite of the word "good." He may respond, "bad, poor, sinful," etc.

A third kind of fluency is called "expressional fluency." It has to do with the facile construction of sentences. The examinee may be asked to write as many four-word sentences as he can, all different, with no word used more than once.

Besides measuring three kinds of fluency, creativity tests also measure two kinds of flexibility. One type of flexibility is recognized as "spontaneous flexibility." Without his knowing it, the examinee can make a good score if he varies his kinds of responses. If the examinee is asked to list all the uses he can think of for a common brick, the total number of uses is scored, but he is also scored for the number of times he changes category of uses.

Another kind of flexibility is called "adaptive flexibility" which means the examinee must make some kind of changes in interpretation of the task, in approach or of strategy in solution.

Another kind of ability is called "elaboration." In one test, given the bare outlines of a plan, the examinee is asked to produce the detailed steps needed to make the plan work. The more details he adds, the better is his score. The examinee is producing a variety of implications.

It is recognized that the abilities of fluency, flexibility, originality, and elaboration are similar in that the tests call for a variety of answers. There is no right or fully determined answer in connection with the information given in the item. Creativity tests may be either figural or verbal. Guilford's and Torance's Tests of Creative Thinking are the most widely used.(11. pp. 484-500)

II. TEACHING FOR CREATIVITY

The necessary condition of creative thinking is the condition of connectiveness. Man works with materials which he himself has not created. Since he is not God, he cannot create out of nothing. Therefore he must create by bringing already existing elements into a new relationship to each other. Though man does not create the elements, he can produce a new relationship which is original and not simply mechanical.(8. p. 19)

Today's basis of art is "doing" with "creative" and "expressive" being the inspirational terms. The direct copying to instill discipline or develop manual dexterity has been replaced by the magic word "create." Students learn the artist's language; color, composition, and technical procedures assume a new, adult meaning. Their interest is no longer determined by the limits of their own dexterity, but by inquiry and exploration. Art becomes a clarification of ideas and feelings of which they become aware. It is not a "cultural" subject but rather an introduction into a new, complex, adult life.(27. p. 238)

Art education also means art appreciation and art history. Criteria for deciding the aesthetic value of art shifts from time to time, from culture to culture, and from art school to art school. Students examine various criteria themselves and choose those they wish to use in making their judgment. When they decide upon criteria, they are determining what facts are relevant and worth considering. They are also justifying their own judgment, becoming skilled in handling the question of value, alert to the downfalls of reasoning, capable in making decisions and taking action, and perceptive to the deeper meanings of art.(25. pp. 270-271)

Since the necessary condition of creative thinking is the condition of connectiveness, learning in art is learning to interact both in and out of the classroom. Interaction is the key of learning through action and is the primary objective in art education.

A major part of the teacher's problem, then, is to identify the interactive difficulties of the pupils. For every level of creative achievement, there appears to be an interactive problem with which the pupil must struggle in order to interact more effectively with his environment. The lowest level of creative action in the arts are the "deliberate" students who work in a step-by-step manner with their work always preconceived. It varies from very general, literal, or stereotyped forms to very detailed and sometimes realistic representation. In the classroom, they are "adaptive, non-interactive, and often other-directed." They are also more rigid and when faced with creative problems, they are extremely insecure. Because interactive living requires

self-direction and self-evaluation, the deliberate student is the most difficult problem the art teacher faces today. The deliberate students' greatest need is more opportunity to learn by discovery rather than by simply being informed. Their greatest misfortune is that they have avoided interacting with others for so long that they have little self-awareness of what life holds for them. Their interactive struggle stems from their inability to think of themselves as having a self, a need to be more aware, a desire for discovery, and a yearning for expression and sharing. These students need to develop a flexible way of thinking based on creative learning as a means of discovery and the use of imagination to replace realistic preconceptions.

The opposite of this deliberate, factual orientation, is action characterized by spontaneity in feeling and thought. "In varying degrees these students have been shown to be flexible, complex, impulsive, inquisitive, abstract, perceptive, intellectually and emotionally open, and self-determining in their personality structure."

The lowest level of spontaneous expression is action centered in the self so that perceiving other's reactions to oneself is non-existent. This overly subjective, limited awareness makes it difficult for objective self-evaluation which is necessary if the student is to develop beyond the stage of emotional impulses and undeveloped statements. The interactive struggle for these pupils is learning objective evaluation and elaboration of their emotional ideas. This means discovering objective forms of self-awareness associated with mental and emotional maturity.

Other spontaneous pupils are highly introspective and somewhat self-reflective. This greater degree of self-awareness enables them to become involved in their work beyond their interest in expressing their feelings and to become concerned with problems of art as a more disciplined form of creating. They also experience frustration at shortcomings in their work, regarding this as shortcomings in their creative talents. In taking no risks for the sake of their own development, they are failing themselves and their own sense of worth. They need to realize that failure may reveal a new courageous spirit, resulting in a greater sense of worth. They need to have faith in their capabilities so they may risk full involvement in the process of discovery.(3. pp. 1-6)

Interactive problems are also reflected in attitudes toward art processes and products. Spontaneous groups are process-oriented with a strong interest in motion. They are likely to start without an idea, change their idea, or evolve ideas during the working process. They have a positive response to mistakes, integrating them into an emotional or expressive purpose. Their method of work is either by trial and error or by considering all aspects of the work --media, subject matter, and process--simultaneously with respect to their effect upon the whole.(3. pp. 51-52)

Deliberate groups are more product-oriented and their work is more static in character. Their method of work is analytical--step-by-step, one thing at a time. They think very deliberately, repetitiously, fear mistakes, and get satisfaction from the technical success rather than emotional or expressive purpose.(3. pp. 51-52)

"The capacity to be genuinely creative is, therefore, mostly a matter of possessing the spirit to struggle; to establish beyond doubt, for one's own sense of integrity or loyalty to one's self-worth in all that is undertaken."(3. p.6)

III. SUMMARY

The findings concerning creativity so far have been only suggestive and by no means conclusive; however, there is considerable agreement that the creative attitude has been built into the species. Traits characteristic of creative performance, working strategies of creative individuals, and instruction conducive to creative productivity have been identified. Creative individuals have been discovered to be persistent, acceptive of disorder, adventurous, defiant of conventions of health, disruptive of organization, energetic, curious, independent, original, odd in habits, self-assertive, self-confident, not interested in small details, and humorous. Creative individuals have been identified by their sensitivity to problems, and by flexibility, fluency, originality, and elaboration in their thinking. There has also been agreement that intelligence has little or no relationship to creativity. In addition, creative thinking has been discovered to be mostly an unconscious process consisting of four stages--gathering and selecting impressions, revision and recombination, flash of insight, and expression. Since the necessary condition of creative thinking is the condition of connectiveness, instruction conducive to creative productivity emphasizes learning through action. Interaction is the key of learning through action. A major part of teaching

for creativity, then, is identifying the interactive difficulties of the students and getting them to interact more effectively with their environment. The deliberate students need to learn by discovery rather than simply being told, and the spontaneous students need to learn self-evaluation. Research in creativity has probably raised more questions than it has answered, causing art educators to reassess some of their most cherished beliefs concerning the creative productivity of man.

CHAPTER THREE

METHODOLOGY

I. HYPOTHESIS

Using Burkhart's theory of spontaneous and deliberate ways of learning, creative powers in spontaneous or deliberate students should be increased (or released) by:

1. Giving them an opportunity learn by discovery rather than simply being informed.
2. Getting them to think of themselves as having a self which they feel the need to be more aware about and about which they have the desire for discovery, sharing, and a yearning for expression.
3. Giving them divergent questions as a means of providing them with a more imaginative approach to thinking creatively about specific experiences.
4. Learning some of the objective evaluative processes for the development and elaboration of their emotional ideas.
5. Giving them the capacity to be possessed with the spirit to struggle, to take risks, to learn that there are kinds of failures which result in a greater sense of self-worth.

HYPOTHESIS. In a teaching situation using an approach conducive to spontaneous and deliberate ways of learning, an unstructured art class should show a significantly greater increase in

scores on the Torrance Test of Creative Thinking but lower scores on art grades. A structured art class should show a lower increase in scores on the Torrance Test of Creative Thinking but a higher increase in scores on art grades.

II. SAMPLE

Student samples had been obtained from two Art I classes at Roosevelt Senior High School in Virginia, Minnesota. The randomly distributed groups consisted of thirty-two girls and seven boys in tenth, eleventh, and twelfth grades scheduled for art classes during periods three and five by the principal and two counselors. The groups were Caucasian Americans with the exception of one male Indian. Their ages ranged from 15-20; their I.Q.'s from 79-130; their senior high school gradepoint averages from .90-3.5; and their junior high school art grades from .00-4.0.

III. INSTRUMENTS

The average aptitude level of these students was based on I.Q., gradepoint average in the senior high school, and junior high school art grades. To determine their creative level, the students had been given the Torrance Test of Creative Thinking with the scores based on fluency, flexibility, originality, and elaboration. The students' personalities had also been identified as either spontaneous or deliberate by Gogel (3. p. 48) and the Process Response Form for Identification of Spontaneous and Deliberate Groups. (3. p. 57)

TORRANCE TEST OF CREATIVE THINKING. The first task, a Picture Construction Activity has been devised by Torrance. The subjects

are required to draw a picture integrating a colored-paper shape with an adhesive backing. They are encouraged to think of something that no one else in the group would produce and to add ideas that would make the picture tell as complete and as interesting a story as possible. This activity has a limit of ten minutes and is scored for originality and elaboration.

The second task, the Incomplete Figures Activity, has been developed by Kate Franc. According to Gestalt psychology, an incomplete figure produces tensions in an individual to complete it in the simplest and easiest way possible. The subject must control his tensions and delay gratification until closure. A time limit of ten minutes is given to complete all ten figures. Each figure completed is scored for flexibility, originality, and elaboration.

The third task, the Repeated Figures Activity, similar to the Incomplete Figures Activity, is based on the ability to make multiple associations to a single stimulus. It is designed to stimulate all four types of divergent thinking and to set up a conflict among the response tendencies represented by them--fluency by "how many objects or pictures you can make"; flexibility by "how many different pictures and objects"; originality by "things that no one else will think of"; and elaboration by "as many ideas as you can." The ten-minute time limit prevents emphasis on any of the four kinds of thinking.

Emphasis on different divergent thinking abilities is varied in the three figural tasks through the instructions. In the first

task, the primary motivation is for originality or unusualness with elaboration being secondary. In the second task, flexibility or variety of responses is added to originality and elaboration with fluency a minor consideration. In the third task, fluency is the primary motivation with originality, elaboration, and flexibility.(28. pp. 14-16)

SPONTANEOUS AND DELIBERATE LINE DRAWING SCALE. "Deliberate drawings in general appear to be more detailed and angular and are drawn with short, definite, studied lines. The over-all effect ranges from crude, stiff, or confidently made lines to lines which are distinct, refined, and polished. The drawings appear to be static and imply movement mainly through the detailed content pattern of organization or by lines pointing in a specific direction."

"Spontaneous drawings in general appear to lack specific detail and are often drawn with lines that are long, free, or boldly made. The over-all effect ranges from indecisive and vague lines to impulsive, vigorous, and energetic lines. The drawing lines themselves appear to be active and effortlessly made and indicate movement through loose, flexible, restless lines without regard for content."(3. p. 48)

THE PROCESS RESPONSE FORM FOR IDENTIFICATION OF SPONTANEOUS AND DELIBERATE GROUPS.

Spontaneous Group

Process orientation

Intuitive development

Mistakes often taken as a challenge

Dynamic visualization

Unrealistic symbolic orientation

Often the student is not cognizant of passing time

Expressive objectives

Increasing interest for working process

Variety in concepts of details

Enjoyment of new media in spite of difficulty

Working all over picture surface

Alteration of concepts during working process

Broad range of positive to negative feelings accompanied by rapid changes in mood

Deliberate Group

Product orientation

Preconceived forms

Mistakes often considered "wrong" and a threat

Static visualizations

Realistic orientation

Time element considered

Technical objectives

Declining interest in working process

Monotonous in concepts of detail

Disgust with difficulties presented by new media

Work on one section at a time

Persistent adherence to one theme

Narrow range of responses; static or gradual changes in mood (3. p. 52)

IV. PROCEDURE

The students were told that they were going to take part in an experiemental art program based on research in creative thinking, that a psychologist from the Range Mental Health Center would conduct an exercise in creative thinking at the beginning and at the end of the semester, and that the results of the first experiment would determine which class would be the unstructured art class and which would be the structured art class. The first Torrance Test of Creative Thinking was administered by Dr. Jerome Nichols of the Range Mental Health Center on January 15, 1971. The results follow:

T O R R A N C E T E S T

Period	Age	Sex	IQ	GPA	Art	Personality	Flu.	Flex.	Orig.	Elab.	Ave.
III	16	F	105.9	1.98	2.63	S	22.88	17.57	33.81	61.25	33.88
V	16	F	102.4	1.87	2.32	D	17.95	15.15	29.30	76.20	34.65

Since the class averages in age, sex, I.Q., G.P.A., art grades, and Torrance Test Scores were close, Period III class was chosen as the creative class because of its already spontaneous way of working.

The Art I curriculum for the experimental art program included exploring line, color, shapes (related, expressionistic, and naturalistic), positive and negative spaces, texture, and emotion. Visual aids were used included films ("Discovering Line," "Discovering

Color," "Discovering Composition in Art," "Cubism " "Discovering Harmony in Art," and "Art in the Modern World"), slides on Manet, Degas, Pissaro, Corot, Cezanne, Braque, Gris, Davis, Picasso, Leger, Rembrandt, Rodin Bourdelle, Barlach, Modigliani, Lehmbruch, More, Hepworth, Arp, Gonzales, Pevsner, magazine articles and materials from books shown on an opaque projector, and Rheinhardt's Visual Aids. Each unit was started with a lecture on the contemporary versus historical approaches to the subject matter including visual aids emphasizing different examples. The unstructured class was encouraged to explore the subject matter in any way using any media available. They also were encouraged to try more than one way. The structured class was given a definite assignment exploring the subject. Assignments included mixing colors, values, intensities, and color schemes, pointillism painting, cardboard print, cubistic painting, figure drawing, zonolite carving, jewelry, wood construction, and redesigning of a poor advertisement. Individualized instruction based on the spontaneous and deliberate approach stressing student evaluation and expression began in both classes once the students had begun working on their projects.

CHAPTER FOUR

ANALYSIS OF DATA

I. STATISTICAL RESULTS

The second Torrance Tests of Creative Thinking were administered by Dr. Jerome Nichols on May 10, 1971. The tests were graded face down by sections rather than by individual tests so the subject and group were not known. The results are as follows:

T O R R A N C E T E S T

Period	Art	Flu.	Flex.	Orig.	Elab.	Average
III	2.45	22.31	17.94	41.07	81.57	40.72
V	2.88	19.80	15.35	29.30	65.75	32.55

T-Tests, parametric tests investigating the significance of the performance of a single class before and after an experiment, and the significance for two means of independent groups were made. Correlations investigating the relationships between I.Q., G.P.A., Jr. High art grades, sex, and personality versus the first Torrance Test scores were made. The results are as follows:

<u>T-Tests</u> on before and after test scores

Unstructured class -5.10

Structured class 1.09

T-Tests on after scores of both classes:

-2.39

CORRELATION COEFFICIENTS:

I.Q.	.47
G.P.A.	.36
Art	.20
Age	-.17
Personality	.16

GREATEST INCREASE in Torrance Test Scores:

Unstructured class	Elaboration	20.62

Greatest Decrease in Torrance Test Scores:

Structured class	Elaboration	10.45

II. INTERPRETATION OF DATA

The T-Tests must be regarded as significant. The null hypothesis, that there is no difference between the true means of the group when "t" is less than 1.96, must be accepted in the case of the structured class. However, as in the other two tests, the null hypothesis must be rejected because "t" is lower than the .05 level of probability meaning that the probability is less than 2 in 100 or less than 1 in 100 as in the test on the before and after scores of the unstructured class.[26. pp. 77-87] In addition, the correlations smaller than .50 are of limited value.[26. p. 98]

The final results seem to indicate that part of the hypothesis is correct, however. The unstructured class showed a significant increase in the Torrance Test of Creative Thinking, whereas the structured class showed a slight decrease. Yet, in both art classes the art grades remained the same. Burkhart's theory of spontaneous and deliberate ways of learning seemed to enhance creative powers in both spontaneous and deliberate personalities. This success was probably reinforced by the success-oriented traditional-learning structure of the school(24. p. 67) and the behavior patterns of adolescence.

The success-oriented, traditional-learning structure of the educational system emphasizes rote memory and convergent thinking--thinking that is directed toward one right answer instead of many possible solutions. Mathematics, for instance, emphasizes finding one correct answer. Other academic areas, i.e., English, history, georgraphy, also emphasize learning the correct answer. Learning authoritatively is similar to being told to learn something instead of seeking to learn something on one's own initiative which is learning creatively. It is learning to please teachers in order to get a grade to please parents. It is the difference between being willing to accept, without reservation, many undocumented items from an authority, or accepting only after finding their validity for oneself.(12. p. 14)

Students reject this authoritative learning situation. They want to sense a weakness in the chain of knowledge, make guesses and pose hypotheses, test and change these hypotheses, and strive

for solutions by methods which may be fantastic. They want to learn to strive for not one right answer but many possibilities from which they can choose. This means learning from failures, which is frowned upon in a success-oriented society. This is the opportunity to learn by discovery rather than simply being informed and the capacity to be possessed with the spirit to struggle, to take risks, to learn that there are kinds of failures which result in a greater sense of self-worth that Burkhart emphasizes.

According to Rogers, the external conditions that encourage creativity are psychological freedom and safety. Psychological freedom is permission to be oneself. Psychological safety is established by accepting the individual as being worthy and establishing empathy.(15. p. 171) Psychological freedom and safety are emphasized in Burkhart's theory and are especially important in regard to adolescent psychology. The adolescent is a person in the middle of an identity crisis. He is neither a child nor an adult. His behavior typically vacillates between demanding full responsibility and avoiding it. He is uneasy with his newly-found freedom and has gradually to come to terms with it. Along with accepting this new freedom, he must also build up a tolerance for the frustrations and ambiguities of life. Subsequently, he takes satisfaction in minor achievements which reaffirm his autonomy. His self-determination may be merely a matter of choosing the group's standards or rejecting all group pressures, choosing rather to follow his unique urges and to strive toward his ideals.(13. pp.217-18)

Adolescence also gives rise to a relatively high incidence of "ego-instability and ego-reformation." The culture pattern of our rapidly changing society fails to prepare children for the transition from childhood to adulthood. This process is frequently complicated with the adolescent never completely departing from his childhood habits and therefore causing adolescence to be a period of great conflict and deep inner changes.(13. pp. 232-233)

The "ego-instability" and minor achievements characteristic of adolescence are particularly true in the behavior of the unstructured class. Whereas the structured class has been given a specific assignment, the unstructured class has been given various suggestions from which they could get ideas to explore. The freedom of choice has been the biggest problem. They have trouble making a decision; they keep changing their minds; they spend much time thinking and less time doing; they become so excited exploring possibilities that they seldom explore one thing long enough to come up with anything of esthetic value. However, the psychological freedom and psychological safety having been established by accepting them as individuals worthy of expressing themselves seems to have over-ridden the "ego-instability" of adolescence. Either that, or the "ego-instability" and satisfaction from minor achievements might have enhanced creativity by keeping their minds open to the endless possibilities. Burkhart's theory also aids the "adolescent identity crisis" by giving students the desire to develop, share, elaborate, and express their emotional ideas, thus aiding in the development of the "self."

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

I. SUMMARY

Man is an organism that not only lives "in but through" his environment--an environment which is sometimes friendly and sometimes hostile. He must either control his environment or adjust to it. Either way, he uses past experience or past resolutions in his attempts to solve problems that arise during his lifetime. Education must therefore be conceived as a "process of expanding human intelligence," opening man's intellectual capacity to the many possible solutions to any one problem. Only an educational system that provides physical, emotional, and intellectual freedom will allow man the opportunity to exercise his intelligence on problems that are meaningful to him and his environment. This means not only knowledge of things but knowledge of his own individual relationship toward them, becoming more sensitive to the needs of others, and subordinating himself to the needs of his environment. It also means divergent thinking: not looking for one right answer but for the many possible answers from which man can choose; looking for fresh, original, and valuable ideas on a continuous basis; learning to think creatively.

Creativity, according to the Fifth Utah Creativity Research Conference, has been defined as forming new combinations of related elements in a useful way or the capacity to produce fresh, original, and valuable ideas on a continuous basis.(19. pp. 55-56) In recent

years, creativity has been the subject of much research by psychologists. There has been considerable agreement among a number of writers that the creative attitude seems to have been built into the species,(8. pp. 126-127) but the findings concerning human creativity have not been conclusive. There is relatively little in the way of hard knowledge; much more is available in the way of descriptive research findings. However, the findings so far remain suggestive.

Nevertheless, authorities tend to agree that the necessary condition of creative thinking is the condition of connectiveness. Man works with materials which he himself has not created. Since he is not God, he cannot create out of nothing. Therefore, he must create by bringing already existing elements into a new relationship to each other--a new relationship which is original and not simply mechanical.(8. p. 19)

Creative learning, then, is learning to make new connections, learning to react and interact, learning through action. In teaching students to learn creatively, the major part of the teacher's problem is one of identifying the interactive difficulties of pupils. For every level of creative achievement, there appears to be an interactive problem with which the pupil must struggle in order to interact more effectively with his environment.

The lowest level of creative action is the "deliberate" student who works in a step-by-step manner with his work always preconceived. His interactive struggle stems from his inability to think of himself as having a self, a need to be more aware, a

desire for discovery, and a yearning for expression and sharing. The deliberate student's greatest need is more opportunity to learn by discovery rather than by simply being informed.(3. p. 3)

The opposite of this deliberate, factual orientation is action characterized by spontaneity in feeling and thought. "In varying degrees these students have been shown to be flexible, complex, impulsive, inquisitive, abstract, perceptive, intellectually and emotionally open, and self-determining in their personality structure." The interactive struggle for these pupils is learning objective evaluation and elaboration of their emotional ideas. This means discovering objective forms of self-awareness associated with mental and emotional maturity. "The capacity to be genuinely creative is, therefore, mostly a matter of possessing the spirit to struggle; to establish beyond doubt, for one's own sake, one's own sense of integrity or loyalty to one's self-worth in all that is undertaken."(3. pp. 4-6)

Using Burkhart's theory of spontaneous and deliberate ways of learning, creative powers in spontaneous or deliberate students should be increased (or released) by:

1. Giving them an opportunity to learn by discovery rather than simply being informed.
2. Getting them to think of themselves as having a self about which they feel the need to be more aware and about which they have the desire for discovery, sharing, and a yearning for expression.
3. Giving them divergent questions as a means of providing them with a more imaginative approach to thinking

creatively about specific experiences.

4. Learning some of the objective evaluative processes for the development and elaboration of their emotional ideas.
5. Giving them the capacity to be possessed with the spirit to struggle, to take risks, to learn that there are kinds of failures which result in a greater sense of self-worth.

In a teaching situation using an approach conducive to spontaneous and deliberate ways of learning, an unstructured art class based on learning through action should show a significantly greater increase in scores on the Torrance Test of Creative Thinking but lower scores on art grades, whereas a structured art class based on learning by simply being told should show a lower increase in scores on the Torrance Test of Creative Thinking but a higher increase in scores on art grades. This hypothesis was tested with experimental (unstructured) and control (structured) groups consisting of student samples obtained from two Art I classes at the Roosevelt High School in Virginia, Minnesota. The randomly distributed groups consisted of thirty-two girls and seven boys in tenth, eleventh, and twelfth grades between the ages of fifteen and twenty. The average aptitude level of these students had been based on I.Q., gradepoint average in senior high school, and junior high school art grades. To determine their creative level the students had been given the Torrance Test of Creative Thinking with scores based on fluency, flexibility, originality, and elaboration. The students

personalities had also been identified as either spontaneous or deliberate by the Spontaneous and Deliberate Line Drawing Scale by Gogel and the Process Response Form for Identification of Spontaneous and Deliberate Groups. After one semester both groups were given their second Torrance Test of Creative Thinking. T-Tests, testing the significance of the performance of a single class before and after the experiment and the significance of two means of small independent groups had been made. A correlation investigating the relationship between I.Q., G.P.A., junior high art grades, sex, personality, and first Torrance Test scores also were made.. The results are as follows:

T-Tests on before and after scores:

Unstructured Class	-5.10
Structured Class	1.09

T-Test between after scores of both groups:

-2.39

Correlation Coefficients:

I.Q.	.47
G.P.A.	.36
Art	.20
Age	-.17
Personality	.16

In a teaching situation using an approach conducive to spontaneous and deliberate ways of learning, the unstructured art class

has shown a significantly greater increase in scores on the Torrance Test of Creative Thinking, whereas the structured class has shown no difference. The art grades of both classes have remained the same. Correlations between I.Q., G.P.A., junior high art grades, age, and personality have proven to be insignificant.

II. SUGGESTIONS FOR FURTHER STUDY

The hyperactivity and brainstorming resulting from interactive learning can best be described as "creative chaos." Whether or not a teacher can be involved in this type of learning situation for five hours a day, five days a week without "tuning out" is questionable.

Because students involved in interactive learning become so intensely preoccupied with exploring, they have trouble recognizing what is worth building on and what is of no value and should be abandoned. They take satisfaction in the minor achievements resulting from discovery. How this creative energy can be channeled into a constructive direction is a problem worth exploring.

Just as intelligence has an optimum level of working ability, creativity might also have an optimum level. Finding this optimum level could transfer a lais sez faire learning situation into a less chaotic, interactive way of learning.

III. CONCLUSION

We live in a changing world. The schools, as well as society-at-large, are in a continual process of transformation. The lessons

learned in solving older problems may no longer be adequate. Individuals must evolve the attitudes and abilities of thought that will help them meet future problems creatively instead of traditionally. The schools must help students acquire independence of thought, initiative, and a striving, creative spirit in order to live productive lives in a changing world requiring flexibility and an ability to adjust.

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A P P E N D I X

T-TEST: The Significance of a Difference between the Means of Two Small Correlated Samples:(26. pp. 85-86)

$$\overline{D} = \frac{\Sigma D}{n}$$

$$S^2 = \frac{\Sigma D^2}{n}$$

$$S_{\overline{D}} = \frac{s}{\sqrt{n-1}}$$

$$t = \frac{\overline{D}}{S_{\overline{D}}}$$

T-Test: The Significance of a Difference between the Means of Two Small Uncorrelated Samples:(26. p. 89)

$$t = \frac{\overline{X} - \overline{Y}}{\sqrt{\left(\frac{\Sigma x^2 + \Sigma y^2}{nx + ny - 2}\right)\left(\frac{nx + ny}{nx \cdot ny}\right)}}$$

(26. p. 104)

CORRELATION COEFFICIENT:

$$r = \frac{[n\Sigma xy - \Sigma x \Sigma y]}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}}$$

A R T I - P E R I O D I I I

Subject	Personality	Age	Sex	I.Q.	G.P.A.	Art	TORRANCE TESTS									
							Flu		Flex		Orig		Elab		Total	
							B	A	B	A	B	A	B	A	B	A
1.	S	17	F	119	2.85	B B	26	38	18	30	41	40	126	116	211	224
2.	S	17	F	97	1.38	B B	23	23	16	18	21	43	93	103	153	187
3.	D	17	F	83	1.75	B B	22	23	19	21	40	68	40	41	121	153
4.	S	16	F	129	3.04	B B	25	32	18	25	39	42	85	98	167	197
5.	D	17	M	103	1.53	C C	21	11	18	9	28	32	27	40	94	92
6.	D	15	F	114	3.28	B-A B	18	18	15	12	23	36	79	104	135	170
7.	S	16	F	104	2.36	B C	13	24	13	23	14	32	51	70	91	149
8.	D	17	F	130	3.08	B-C B	19	17	12	16	30	30	51	57	112	120
9.	S	16	F	103	1.43	C C	25	22	19	21	43	57	30	30	117	130
10.	S	17	F	94	1.48	B-C C	23	29	18	17	31	39	95	134	167	219
11.	S	18	F	90	1.28	C C	23	21	18	18	34	33	27	89	102	162
12.	S	15	F	80	1.85	C- C	20	13	16	12	26	25	51	70	113	120

Subject	Personality	Age	Sex	I.Q.	G.P.A.	Art	TORRANCE TESTS									
							Flu		Flex		Orig		Elab		Total	
							B	A	B	A	B	A	B	A	B	A
13.	D	17	M	106	1.35	C C	28	21	20	18	41	68	85	95	174	202
14.	S	17	F	94	1.65	B-C C	22	21	18	17	30	27	32	46	102	111
15.	S	15	M	96	1.56	C-B C	32	26	25	20	49	53	53	122	159	221
16.	D	15	M	99	2.00	A-C C	26	18	18	10	51	32	55	92	150	152
Av.	S	16	F	105.9	1.98	2.63 C	22.88	22.31	17.57	17.94	33.01	41.07	55.0	81.57	135	163

AVERAGE: 33.88 40.72

T-Test -5.10

A R T I P E R I O D V

Subject	Personality	Age	Sex	I.Q.	G.P.A.	Art	TORRANCE TESTS									
							Flu		Flex		Orig		Elab.		Total	
							B	A	B	A	B	A	B	A	B	A
1.	D	16	F	113	3.18	B B	20	16	16	13	45	25	111	69	192	123
2.	S	17	F	107	1.85	B C	16	12	12	10	32	18	49	51	109	91
3.	S	17	F	100	1.26	C C	14	19	13	15	26	21	61	114	124	69
4.	D	15	F	81	.92	D-C C	15	17	13	13	11	20	72	48	111	98
5.	S	15	F	104	2.08	C-A A	10	19	10	15	22	24	75	93	117	151
6.	S	16	M	112	1.76	C B	23	23	19	18	28	42	93	75	163	158
7.	D	17	F	109	2.77	B B	18	26	16	20	28	56	120	118	182	220
8.	S	17	F	92	1.50	C C	25	27	23	22	59	36	49	53	156	138
9.	D	17	F	99	1.63	B B	12	15	9	10	38	27	87	50	146	102
10.	S	17	M	97	1.23	B-C C	28	29	22	24	40	38	77	45	167	136
11.	D	17	M	105	1.25	C C	25	22	21	14	36	43	82	56	164	135
12.	S	17	F	98	1.48	C C	23	17	17	15	18	31	73	64	131	127

Subject	Personality	Age	Sex	I.Q.	G.P.A.	Art		TORRANCE TESTS									
								Flu		Flex		Orig		Elab		Total	
								B	A	B	A	B	A	B	A	B	A
13.	D	17	F	108	1.95	C	C	20	17	17	14	26	19	67	65	130	115
14.	D	16	F	80	SLD	C-B	C	22	27	15	20	28	34	76	68	141	149
15.	D	16	F	107	3.50	B	A	17	17	17	15	31	39	68	57	133	128
16.	D	16	F	113	3.30	A	B	19	21	15	18	30	37	79	86	143	162
17.	S	19	F	79	.90	D	C	10	26	10	17	17	47	68	45	105	135
18.	S	20	F	81	.90	C-F	C	5	8	4	7	10	13	45	19	64	47
19.	S	15	F	94	1.13	C	D+	14	20	14	12	26	22	53	43	107	97
20.	D	17	F	123	3.00	B	B	23	18	20	15	35	28	119	96	197	157
Av.	D	17	F	102.4	1.87	C	C	17.95	19.8	15.15	15.35	29.3	31.0	76.2	65.75	139.1	131.9

AVERAGE 34.65 32.57

T-Test 1.09